

ACCESSION NR: AP4025913

ference in pressure variation between thallium and other superconductors such as lead, indium, and aluminum. An impurity with valence lower than thallium (Hg, Cd) lowers  $T_c$ , while one with higher valence (Bi, Sb) raises it. Differences in the atomic radius likewise have a different effect on  $T_c$ . In this respect thallium is no different from other superconductors, and the impurities affect  $T_c$  in accordance with the differences in their electron free paths, valences, and atomic radii. Orig. art. has: 1 figure.

ASSOCIATION: Fiziko-tekhnicheskiy institut AN UkrSSR (Physicotechnical Institute, AN UkrSSR)

SUBMITTED: 27Aug63

DATE ACQ: 16Apr64

ENCL: 01

SUB CODE: PH.

NO REF SOV: 001

OTHER: 004

Card

2/32

L 52959-65 EWT(1)/EWT(m)/EWA(d)/EXP(t)/EWP(z)/EWP(b) LJP(c) JD/GG

ACCESSION NR: AP5010499

UR/0056/65/048/004/1065/1170

AUTHOR: Lazarev, B. G.; Lazareva, L. S.; Makarov, V. I.; Ignat'yeva, T. A.

TITLE: Impurity effect in the pressure dependence of the superconducting temperature of thallium. I.

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 48, no. 4, 1965, 1065-1070

TOPIC TAGS: thallium, superconductivity, pressure dependence, impurity effect, superconducting transition temperature

ABSTRACT: The article deals with the effects of different impurities on the pressure-induced shift of the superconducting transition temperature of thallium. Samples of 99.998% pure thallium mixed with high-purity bismuth, mercury, and antimony were prepared in the form of wires 0.4 mm in diameter and 15--20 mm long. The homogeneity of the impurity distribution was evidenced by the  $(2-3) \times 10^{-3}$  °K width of the superconducting transition. High pressure was produced by the ice-bomb technique and monitored with a superconducting manometer accurate to  $\pm 50$  kg/cm<sup>2</sup>. The pressure effect was measured by a potentiometer method, using two sam-

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L 52959-65

ACCESSION NR: AP5010499

2  
ples, inside and outside the pressure vessel respectively. The tests show that even small Bi, Sb, or Hg impurity concentrations can reverse the sign of the pressure effect in thallium, making it negative. The anomalous behavior of thallium is attributed to a complex energy dependence of the electron state density near the Fermi surface, and to a sharp impurity effect in the energy spectrum of the thallium conduction electrons. "The authors thank V. G. Bar'yakhtar for a discussion of the results." Orig. art. has: 8 figures and 1 formula.

ASSOCIATION: Fiziko-tekhnicheskii institut Akademii nauk Ukrainsskoy SSR (Physico-technical Institute, Academy of Sciences UkrSSR)

SUBMITTED: 20Nov64

ENCL: 00

SUB CODE: SS, GP

NR REF SOV: 007

OTHER: 006

Card 2/2

L 3893-66 EWT(1)/EWT(m)/EWP(t)/EWP(b) IJP(c) JD/GG

ACCESSION NR: AP5018076

UR/0020/65/163/001/0074/0075

AUTHOR: Lazarev, B. G. (Academician AN UkrSSR); Lazareva, L. S.; Ignat'yeva, T. A.; Makarov, V. I.

TITLE: On the change of the topology of the Fermi surface in thallium under the influence of impurities

SOURCE: AN SSSR. Doklady, v. 163, no. 1, 1965, 74-75

TOPIC TAGS: superconductivity, thallium, impurity effect

ABSTRACT: The authors observed experimentally a singular behavior in the temperature of the superconducting transition ( $T_c$ ) of thallium (change in the number of valleys on the Fermi surface) in investigations of the influence of impurities on the pressure dependence of  $T_c$ . The study was made by investigating the joint influence of impurities of different valences and of the pressure on  $T_c$  of thallium. The results show that the impurities whose valence is larger than that of thallium (Bi) decrease the positive pressure effect with increasing concentration, causing the pressure to become negative starting with a certain value of the concentration (0.2 at.%). In the case of an impurity of lower valence (Hg), the positive pressure effect increases at low concentrations. With further increase of the concentration, the positive effect decreases and becomes negative at ~0.9 at.% Hg. The

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L 3893-66

ACCESSION NR: AP5018076

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results are interpreted as an experimental confirmation that one of the valleys of the Fermi surface of thallium vanishes under the influence of an impurity. "The authors thank V. G. Bar'yakhtar for a discussion." Orig. art. has: 2 formulas and 1 figure. 44, 53

ASSOCIATION: Fiziko-tehnicheskii institut Akademii nauk UkrSSR (Physicotechnical Institute, AN UkrSSR) 44, 53

SUBMITTED: 16Feb65

ENCL: 00

SUB CODE: 88

NR REF SOV: 007

OTHER: 005

  
Card 2/2

I. 62230-65 EPA(a)-2/EIA(h)/ENP(k)/EIA(c)/ENT(1)/ENT(m)/ENP(b)/EIA(d)/ENP(t) IJP(c)

ACCESSION NR: AP5019219

CG/JD/HM/JG

UR/0056/65/049/001/0085/0089

AUTHOR: Brandt, N. B.; Ginzburg, N. I.; Ignat'yeva, T. A.; Lazarev, B. G.;  
Lazareva, L. S.; Makarov, V. I.

44  
42  
8

TITLE: Influence of impurities on the pressure effect in thallium 27

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 49, no. 1, 1965, 85-89

TOPIC TAGS: thallium, mercury, mercury impurity, impurity effect, pressure effect, Fermi surface, high pressure research

ABSTRACT: This is a continuation of an earlier study (ZhETF v. 48, 1065, 1965) of the influence of impurities on the superconducting transition temperature of thallium under pressure. In the present study, to check on some of the hypotheses advanced in the earlier paper, the authors extended the pressure range to 28,000 atm, and measured the pressure effect in both pure and mercury-bearing thallium, using the same thallium-mercury alloys as in the earlier work. Cylindrical samples of 2.5 mm diameter and 3-4 mm length were used, and the superconducting transition was measured with a tin manometer and recorded by an induction method. The apparatus and procedure employed were the same as described in detail elsewhere (PTE no. 2, 131, 1960; FTT v. 3, 3461, 1961), apart from slight modifications. It was

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L 62230-65

ACCESSION NR: AP5019219

2

found that at high pressures (20,000—28,000 atm) the dependence of the transition temperature ( $T_c$ ) on the pressure (P) was similar for the mercury-bearing and pure thallium, but different at low pressures (up to approximately 7000 atm), with the sign of the effect reversing at a concentration  $\sim 0.9\%$  Th. It is suggested that this behavior of thallium and its alloys is related to the characteristic features of the pressure dependence of the density of states on the Fermi surface. In particular, the results confirm hypotheses advanced in the earlier paper, that thallium has two components in the pressure dependence of  $T_c$ , linear and nonlinear, and that the impurity content affects mainly the nonlinear component. It is possible that the impurity dependence affects the Fermi-surface topology of thallium. Orig. art. has: 3 figures. [02]

ASSOCIATION: Moskovskiy gosudarstvennyy universitet (Moscow State University); Fiziko-tekhnicheskiy institut Akademii nauk UkrSSR (Physicotechnical Institute, Academy of Sciences, UkrSSR)

SUBMITTED: 05Feb65

ENCL: 00

SUB CODE: M,SS

NO REF SOV: 005

OTHER: 002

ATD PRESS: 425

Card 2/2

AMEROZHIY, N.M.; DVORNIKOVA, L.M.; LAZAROVA, L.S.

Europium and gadolinium hydroxides and products of their  
thermal decomposition. Zhur.neorg.khim. 11 no.1:86-89  
Ja '66. (MIRA 19:1)

1. Saratovskiy gosudarstvennyy universitet i Nauchno-issledova-  
tel'skiy institut khimii, kafedra neorganicheskoy khimii.  
Submitted February 1, 1964.



L 19581-63 EPR/EPF(c)/EWP(q)/EWT(m)/EWP(B)/BDS AFFTC/ASD Pr-4/  
Pg-4 WH/JD/WH/JG/K/MLK(a)  
ACCESSION NR: AP3007610 S/0286/63/000/010/0072/0072

AUTHOR: Vasyutinskiy, B. M.; Kogan, V. S.; Lazarev, B. G.; *263*  
Lazareva, L. S.

TITLE: Tinplating of graphite.<sup>15</sup> Class 48, No. 154752<sup>15</sup>

SOURCE: Byul. izobret. i tovarny\*kh znakov, no. 10, 1963, 72

TOPIC TAGS: graphite tinning, graphite tinplating, vacuum tinning,  
vacuum tinplating, carbide forming additives, tin coat

ABSTRACT: A patent has been issued for a method of tinning graph-  
ite parts by immersing them in molten tin. To obtain a high-  
quality tin coat, the tinning process is carried out in vacuum at  
1000C with a maximum of 0.01% tungsten, molybdenum, titanium,  
zirconium, or other carbide-forming metals added to the tin bath.

ASSOCIATION: none *27*

SUBMITTED: 21Jun62 DATE ACQ: 14Oct63

ENCL: 00

SUB CODE: ML

NO REF SOV: 000

OTHER: 000

L 38546-66 EWT(m)/EWP(w)/T/EWP(t)/ETI IJP(c) JD/JG/GD

ACC NR: AT6014753

SOURCE CODE: UR/0000/65/000/000/0076/0082

AUTHORS: Kogan, V. S.; Krivko, A. I.; Lazarev, B. G.; Lazareva, L. S.; Matsakova, A. A.; Ovcharenko, O. N.

ORG: none

TITLE: The phase diagram of the niobium-tin system

SOURCE: Soveshchaniye po metallovedeniyu i metallofizike sverkhprovodnikov. 1st, 1964. Metallovedeniye i metallofizika sverkhprovodnikov (Metallography and physics of metals in superconductors); trudy soveshchaniya. Moscow, Izd-vo Nauka, 1965, 76-82

TOPIC TAGS: superconductivity, superconducting alloy, tin base alloy, niobium alloy, x ray analysis, spectrographic analysis, critical magnetic field, intermetallic compound, alloy phase diagram

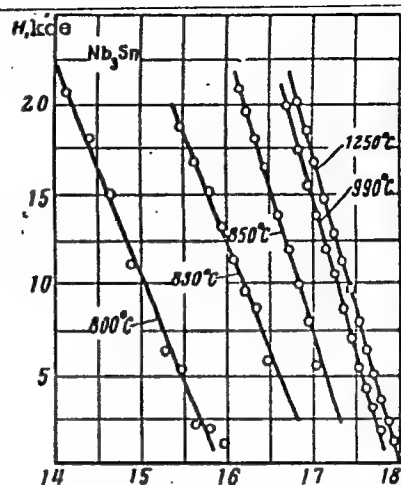
ABSTRACT: This paper is a continuation of an earlier work by V. S. Kogan, A. I. Krivko, B. G. Lazarev, L. S. Lazareva, A. A. Matsakova, and O. N. Ovcharenko (FMM, 1963, 15, 143) in which it was found that specimens produced by holding niobium in molten tin at temperatures above and below 850C differed in their superconducting properties. The superconductivity transition temperature for specimens produced at 990C and 1250C is 18.0K and 18.1K, respectively (see Fig. 1). For diffusion layers formed at below 850C, the superconductivity transition temperature is reduced; the lower  $T_k$ , the lower the temperature of formation of the layer. For specimens

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L 38546-66

ACC NR: AT6014753

Fig. 1. Critical magnetic field  $H_k$  as a function of temperature for diffusion layers of  $Nb_3Sn$  obtained at temperatures of 800--1250C.



obtained at above 850C,  $T_k$  agrees with the known value for  $Nb_3Sn$ . X-ray studies confirmed that only the compound  $Nb_3Sn$  is formed when specimens are prepared at over 850C. For temperatures below 850C, the diffraction pattern shows that  $Nb_2Sn_3$  is formed. It was concluded that in specimens prepared at temperatures below 850C there is present a very thin interlayer beneath the new phase. The formula  $NbSn$  is ascribed to the new compound. The superconductivity transition temperature of the  $NbSn$  was found to be 2.7K. In other papers the new compound has been given the

Card 2/3

L 38546-66

ACC NR: AT6014753

formula  $NbSn_2$  or  $Nb_2Sn_3$ . The authors thank L. N. Mosova for conducting the qualitative spectral analysis. Orig. art. has: 5 graphs, 1 table, and 1 photograph.

SUB CODE: 11, 20/ SUBM DATE: 23Dec65/ ORIG REF: 002/ OTH REF: 018

Card 3/3 *llb*

L 38537-66 EWT(m)/T/EWP(w)/ENP(t)/ETI IJP(c) JG/JD/GD

ACC NR: AT6014756

SOURCE CODE: UR/0000/65/000/000/0089/0090

AUTHORS: Lazarev, B. G.; Lazareva, L. S.; Matsakova, A. A.; Ovcharenko, O. N.

ORG: none

TITLE: The superconductivity of  $V_3Ga$

SOURCE: Soveshchaniye po metallovedeniyu i metallofizike sverkhprovodnikov. Ist. 1964. Metallovedeniye i metallofizika sverkhprovodnikov (Metallography and physics of metals in superconductors); trudy soveshchaniya. Moscow, Izd-vo Nauka, 1965, 89-90

TOPIC TAGS: superconductivity, critical magnetic field, hydrostatic pressure, gallium compound, vanadium compound, intermetallic compound

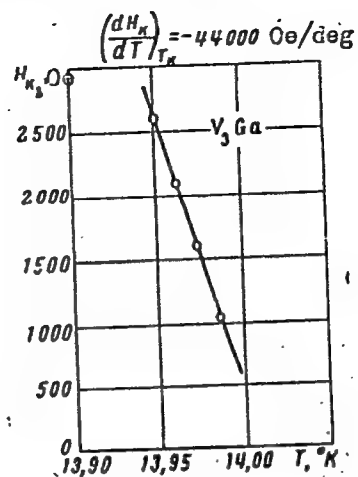
ABSTRACT: The superconducting properties of the intermetallic compound  $V_3Ga$  are studied. The compound was prepared by arc smelting in an argon atmosphere. The specimens were in the form of wafers with a thickness of  $\sim 5$  mm. The effect of hydrostatic pressure on the transition temperature was determined. The critical magnetic field as a function of temperature was also studied (see Fig. 1). The specific-heat discontinuity and the discontinuity of the thermal expansion coefficient could not be determined from the data of the work.

Card 1/2

L 38537-66

ACC NR: AT6014756

Fig. 1. Critical magnetic field  $H_k$  as a function of temperature near  $T_k$  for  $V_3Ga$ .



Orig. art. has: 2 graphs.

SUB CODE: 11,20/ SUBM DATE: 23Dec65/ ORIG REF: 005/ OTH REF: 003

Card 2/2  $\Phi$

SPIVAK, C.V.; KROKHINA, A.L.; LAZAREVA, L.V.

Breakdown of glass by the etching effect of ionic bombardment.  
Dokl.AN SSSR 104 no.4:579-580a 0 '55. (MIRA 9:2)

1.Moskovskiy gosudarstvennyy universitet imeni M.V.Lomonosova.  
Predstavleno akademikom P.A.Rebinderom.  
(Glass manufacture--Chemistry) (Ions)



LAZAREVA, L.V., inzhener.

Reducing the visibility of transverse stripes in knit fabrics.  
(MIRA 9:6)  
Leg. prom. 16 no.1:30-33 Ja '56.  
(Knit goods industry)

LAZAREVA, L.V., inzh.

Single roller B-110 napper. Leg.prom. 18 no.6:35-36 Je '58.  
(MIRA 12:10)

(Textile machinery)

AUERMAN, L.Ya.; PUCHKOVA, L.I.; LAZAREVA, L.V.

Surface active properties of phosphatide concentrate in interaction with flour, gluten, and starch. Izv. vys. ucheb. zav.; pishch. tekhn. no.4:75-78 '61. (MIRA 14:8)

1. Moskovskiy tekhnologicheskii institut pishchevoy promyshlennosti, kafedra tekhnologii khlebopekarnogo proizvodstva.  
(Phosphatides) (Flour)

SPIVAK, G.V.; PRYAMKOVA, I.A.; FETISOV, D.V.; KABANOV, A.N.; LAZAREVA, L.V.;  
SHILINA, A.I.

Mirror-type electron microscope for studying surface structures.  
Izv.AN SSSR, Ser.fiz. 25 no.6:683-690 Je '61. (MIRA 14:6)

1. Fizicheskiy fakul'tet Moskovskogo gosudarstvennogo universiteta  
im. M.V.Lomonosova.

(Electron microscope)

LAZAREVA, L.V.; FILIPPOVA, T.F.

Some properties of carbon and quartz replicas from polished surfaces.  
Izv. AN SSSR. Ser. fiz. 25 no. 6: 760-763 Je '61. (MIRA 14:6)

1. Fizicheskiy fakul'tet Moskovskogo gosudarstvennogo universiteta  
im. M.V. Lomonosova.  
(Powder film) (Photomicrography)

LAZAREVA, L.V.; SPIVAK, G.V.

Electron-microscopic observation of magnetic microfields with the  
aid of replicas. Izv.AN SSSR.Ser.fiz. 25 no.6:742-747 Je '61.  
(MIRA 14:6)

1. Fizicheskiy fakul'tet Moskovskogo gosudarstvennogo universiteta  
im. M.V.Lomonosova.  
(Electron microscopy) (Magnetic fields)

SHPUNTOVA, M.Ye.; SHNAYDER, Ye.Ye.; CHEPUGO, S.V.; LAZAREVA, L.V.;  
MASLOVA, L.G.; ROSHCHINA, V.I.; Prinimali uchastiye: PAVLENKO, V.M.,  
starshiy laborant; GERASIMOVA, L.I., starshiy laborant

Pentose hydrolysis of cottonseed hulls and corncobs with hexose  
hydrolyzates. Sbor.trud. NIIGS 11:7-15 '63. (MIRA 16:12)



ACCESSION NR: AP4033144

S/0120/64/000/002/0181/0184

AUTHOR: Lazareva, L. V.

TITLE: Magnetic suspension of superconductors

SOURCE: Pribery\* i tekhnika eksperimenta, no. 2, 1964, 181-184

TOPIC TAGS: superconductor, electric superconductivity, magnetic suspension

ABSTRACT: An experimental investigation of suspending superconducting spheres in a magnetic field built by various sources is reported. Hollow Pb-coated spheres had a diameter of 15, 30, or 45 mm, Pb film being 50-500 microns, and a weight of 9-50 g. Solid Pb and Nb spheres 15- and 30-mm in diameter weighed up to 120 g. Superconductive rings used to create the magnetic field were made from Pb and Nb and were excited by solenoids placed outside the dewar vessel. A sphere whose weight exceeded a certain critical value was reliably suspended from a single current-carrying ring. To support the sphere in

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ACCESSION NR: AP4033144

He vapor or vacuum, a higher current than when the sphere is in liquid He is necessary. Curves of suspension height vs. current are presented. The optimum geometry of the suspension system was also investigated. "I consider it my pleasant duty to thank A. I. Shal'nikov for his valuable advice in staging the experiments, his constant interest, and his enthusiastic participation in discussing the results. I am also grateful to L. V. Belov for developing methods for and the preparation of the hollow lead spheres used in the experiments." Orig. art. has: 6 figures and 5 formulas.

ASSOCIATION: none

SUBMITTED: 01Feb63

DATE ACQ: 11May64

ENCL: 00

SUB CODE: GP

NO REF SOV: 000

OTHER: 005

Card 2/2

LAZAREVA, L. V.

Scattering of neutrons by protons. L. E. Lazareva  
*J. Exptl. Theoret. Phys.* U. S. S. R., 1967, 42, 1018.  
 From measurements on the angular distribution of protons  
 resulting from bombardment in a hydrogenated  
 Wilson chamber by neutrons of 4 m. e. v. energy, it  
 finds that the cosine-law and spherical symmetry are  
 obeyed. This confirms the findings of Day and Gilbert  
*Proc. Roy. Soc. (London)* A163, 193 (1937), and C. J. 32,  
 225 (1956), of Kruger, Shoup and Stallmann C. J. 31, 845,  
 and of Bonner C. J. 31, 845, for lower velocity neu-  
 trons (2.0 m. e. v.).  
 F. H. Rathmann

ASAC 11A - METALLURGICAL LITERATURE CLASSIFICATION

LAZAREVA, L., GROSHEV, L. V., VEKSLER, V.,

"Penetrating (Atmospheric) Showers in Cosmic Rays," The Physical Review, 19-6, Vol. 70, Nos. 5-6, pp 440-441. (In English available at Battelle Memorial Institute).

The number of coincidences between counter trays arranged horizontally was compared with that when they were arranged one above the other, and was found to be only about  $1/5$ . The difference, however, could not be ascribed entirely to heavily ionizing particles, as a substantial proportion of the vertical coincidences remained when twelve cm. of Pb is interposed, indicating penetrating (probably meson) showers. These showers were produced in the atmosphere, as the apparatus was effectively in the open air, and were about twice as frequent as Auger showers producing 710 particles on each 700 cm tray, 50 cm. apart. The mechanism of production of these showers is discussed.

LAZAREVA, L.

The yield of neutrons in the photodisintegration of uranium and thorium. L. P. Lazareva, B. I. Gavrilov, B. N. Vainov, G. N. Zaslavina, and V. S. Slavin. *Soviet Akad. Nauk S.S.S.R. for Mirnaya Tipografiya Atomnoi Energii, Zasedaniya Otdel. Fiz.-Mat. Nauk*, 1955, 306-20 (English summary, 320-1).—The photodisintegration of  $U^{238}$  and  $Th^{232}$  was investigated with photons from a 30-m.e.v. synchrotron. For bremsstrahlung photons with  $E_{max}$  from 6 to 23 m.e.v., the yield of photon neutrons and the av. ratio  $r(E_{max})$  of neutron to fission yield were measured. For  $E_{max} = 18.5$  m.e.v., the yields of delayed neutrons accompanying the photodisintegration of  $U^{238}$  and  $Th^{232}$  were measured also. The photon neutrons passed through a paraffin moderator and were registered in a BF<sub>3</sub> ionization chamber. The yield of fission fragments was measured by aid of a differential parallel-plate ionization chamber. The flux of bremsstrahlung photons, impinging on the sample, was detd. by measuring the ionization inside an Al chamber with 7.5 cm. thick walls. From the obtained curves, by aid of the photon difference method, one could now calc. the photon neutron cross section curves ( $\sigma_n$ ) and the photofission cross-section curves ( $\sigma_f$ ) for  $U^{238}$  and  $Th^{232}$ ; the integrated cross sections for  $U^{238}$  were thus found to be 12.9 and 1.7, and for  $Th^{232}$  6.6 and 0.64 m.e.v.-barn, resp. Analysis of the  $\sigma_n$  and  $\sigma_f$  curves makes it possible to est. the probability for  $U^{238}$  and  $Th^{232}$  fission at various energies of the  $\gamma$ -ray excitation. This probability is fairly const. for  $U^{238}$  with 0.2-0.3, but for  $Th^{232}$  it is about 0.1 at 8-11 m.e.v., and increases to 0.3-0.4 at higher m.e.v. For an av. excitation energy of 12 m.e.v. the yield of delayed neutrons (as % of the total neutron yield) is  $0.41 \pm 0.02$  for  $U^{238}$  and  $0.18 \pm 0.01$  for  $Th^{232}$ .  
Werner Jacobson

7M  
4 Rms

LAZAREVA, L. E.

USSR:

Atmospheric showers of cosmic rays at an altitude of 3860 meters. L. E. Lazareva. *Trudy Fiz. Inst., Akad. Nauk S.S.S.R.*, *Fiz. Inst. im. P. N. Lebedeva* 4, 103-60 (1949).—A new method of studying the Auger showers is described. It is based upon the observation of the coincidence in 2 groups of proportional counters (analogous to 2 ionization cameras). This method was used to det. the distribution of the "ionization impact" with respect to the value of  $N_{min}$ . ( $N_{min}$  is the min. no. of particles being counted) from Auger showers over the d. interval  $p = 20$ —500 particles/sq. m. The distribution law which has been detd. contradicts that obtained by observations with a single ionization camera. The reasons for the divergence in the results from the 2 methods are discussed. J. R. L.

*RmL JH*

LAZAREVA, L. E.

9 F  
IRM

Investigation of the parameters of uranium-graphite heterogeneous systems by the prism method. L. E. Lazareva, O. I. Kozmets, L. B. Lazareva, K. D. Tolstov, E. V. Grobov, I. M. Frank, F. L. Shapiro, and I. V. Shtramkh. *Sessiya Akad. Nauk S.S.S.R. po Mirnomu Tipovaniyu Atomnoi Energii, Zasedaniya Otdel. Fiz.-Mat. Nauk* 1955, 21-50 (English summary, 51-2).—The buckling,  $\lambda^2$ , the multiplication factor  $k$ , and the thermal utilization factor  $\theta$  in a U-graphite heterogeneous system with const. slug diam. were investigated as a function of the U concn.,  $C$ , in a Cd-shielded prism of  $180 \times 180 \times 420$  cm. The equidistant channels in the graphite could be filled either with U slugs or graphite rods.  $C$  in the prism was varied by removing metal from the channels. An at. concn. of  $Nf/Nc = 0.013$ , corresponding to a spacing of about 20 cm., is the arbitrary unit. About half of the channels were of larger diam. so that an air gap existed around the slugs; by moving the slugs from one channel into a wider one, the gap effect could be measured. The values  $\lambda^2$  and  $k$  were detd. according to the exponential method; both had a max. at  $C = 0.8$ , and were 0 at  $C = 0.3$ , and 1 at  $C = 1.0$ ;  $\theta$  was obtained from Cd-ratio measurements; a formula was derived

$(1 - \theta)/\theta = (g/C) - h$ , where  $g$  and  $h$  are consts. This agreed with the results of the diffusion theory,  $k/\theta$  is a linear function of  $C$ ; by extrapolating to  $C = 0$   $k$  can be split into two empirical factors  $\eta$  and  $\phi$ .  $\eta$  is the no. of neutrons generated per thermal neutron captured; it is  $1.34 \pm 0.02$ .  $\phi$  is the probability of fission neutrons reaching the thermal energy region. Thus  $1 - \phi$  is the radiation capture in U, partially compensated by epithermal  $^{238}\text{U}$  fission. It is a linear function of  $C$ . Both air gaps and  $\text{H}_2\text{O}$  gaps were tried for cooling. At  $C < 1.5$   $\text{H}_2\text{O}$  has a neg. effect on  $k$  and at  $> 1.5$  a pos. one; the air gap influences  $\theta$  mostly, but both gap effects of air or  $\text{H}_2\text{O}$  were smaller than anticipated from the elementary diffusion theory; this is simply due to the one-velocity-group treatment, which is mathematically insufficient.

Werner Jacobson

(2)

Werner Jacobson



LAZAREVA, L. E.

14091 AEC-tr-2435((Pt. 1)(p.39-58))  
INVESTIGATION OF THE PARAMETERS OF HETERO-  
GENEOUS URANIUM-GRAPHITE SYSTEMS BY THE  
PRISM METHOD. L. V. Groshev, O. I. Kozinets, L. E.  
Lazareva, K. D. Tolstov, E. L. Feinberg, I. M. Frank,  
P. L. Shapiro, and I. V. Sutrnikh. p.39-58 of CONFER-  
ENCE OF THE ACADEMY OF SCIENCES OF THE USSR ON  
THE PEACEFUL USES OF ATOMIC ENERGY, JULY 1-5,  
1955. SESSION OF THE DIVISION OF PHYSICAL AND  
MATHEMATICAL SCIENCES. (Translation). 20p.  
This paper was originally abstracted from the Russian and  
appeared in Nuclear Science Abstracts as NSA 9-7825.

LAZAREVA, L.E.

10  
1944

4099 AEC-tr-2435((Pt. 1) (p.217-26))  
NEUTRON YIELD IN THE PHOTODISINTEGRATION OF  
URANIUM AND THORIUM. L. E. Lazareva, B. I. Gavrilov,  
B. N. Valuyev, G. N. Zatsopoln, and V. E. Stavinsky  
[Stavinskii]. p.217-26 of CONFERENCE OF THE ACADEMY  
OF SCIENCES OF THE USSR ON THE PEACEFUL USES  
OF ATOMIC ENERGY, JULY 1-5, 1955. SESSION OF THE  
DIVISION OF PHYSICAL AND MATHEMATICAL SCIENCES  
(Translation). 10p.

This paper was originally abstracted from the Russian  
and appeared in Nuclear Science Abstracts as NSA 9-7933.

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PM2

GORYUNOV, Boris Fedorovich; KORCHAGINA, Antonina Yakovlevna; LAZAREVA,  
L.I., red.; LAVRENOVA, N.B., tekhn.red.;

[Effect of ships on harbor mooring structures] Vozdeistvie sudov  
na morskoe prichal'nye sooruzheniia. Moskva, Izd-vo "Morskoi  
transport," 1961. 52 p. (MIRA 14:9)  
(Piers) (Waves)

LAZAREVA, L.S.; KANTOR, P.B.; KANDYBA, V.V.

Enthalpy and heat capacity of molybdenum in the 1200° - 2500° K  
temperature range. Fiz. met. i metalloved. 11 no. 4:628-629  
Ap '61. (MIRA 14:5)

1. Khar'kovskiy gosudarstvennyy institut mer i izmeritel'nykh  
priborov.

(Molybdenum—Thermal properties)

24807

S/048/61/025/006/007/010

B117/B212

9.4300 (1055, 1163, 1482)

AUTHORS: Lazareva, L.V. and Spivak, G.V.

TITLE: Electron-microscopic observations of magnetic microfields  
by using impressions

PERIODICAL: Akademiya nauk SSSR. Investiya. Seriya fizicheskaya, v. 25,  
no. 6, 1961, 742-747

TEXT: The present paper has been presented at the 3rd All-Union Conference on Electron Microscopy, held in Leningrad from October 24 to 29, 1960. The authors report on an electron-microscopic method which makes it possible to relate the surface geometry of a ferromagnetic material with its micromagnetic structure. The method is based on an impression taken of the specimen itself but not of the ferromagnetic powder dusted on the object. This method has the following advantages: 1) The impression taken directly from the specimen depends neither on the magnetic nor on the geometric data of the powder. Therefore, high magnifications and also more exact studies of the magnetic-geometric characteristics are possible. 2) Magnetic and structural properties (microgeometry) of the material can

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Electron-microscopic observations ...

be studied simultaneously. The microgeometry of the specimens was investigated by means of carbon or quartz impressions and a transmission electron microscope. At the same time, the magnetic structure corresponding to the state of the specimens (annealed, mechanically or electrolytically polished, stretched) was investigated by the powder method. Textured ferrosilicon (3% Si) was chosen for the tests. About 10 different specimens were studied. The results are characteristic and well reproducible. It was found that the crystallites are oriented nearly parallel to the (110) plane in the rolling direction, and along the direction of rolling they are oriented in the [100] direction. For ferrosilicon this is the direction of easiest magnetization. Monocrystals were etched out from single large crystallites by using nitric acid. The crystallographic orientation of the specimens was determined by X-ray photographs. The specimens were chosen such that the surface investigated was located in a rolling plane inclined at an angle of  $2 - 3^\circ$  to the crystallographic plane (110). The specimens used were of various geometrical shapes (disks, rectangles and polygons) with surfaces ranging from  $0.5 \text{ cm}^2$  to several centimeters, and thicknesses from 0.3 - 1.5 mm. The monocrystal was

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Electron-microscopic observations ...

polished mechanically. The powder patterns in the optical microscope are typical of such specimens for the (110) plane if stresses are present. The type of mosaic structure depends on the grinding direction and does not seem to represent the structure of the internal domains. It is known that the boundaries of the mosaic zigzag. A value of  $106^\circ$  was obtained for stable zigzag angles of ferrosilicon (Ref.11; Chikazumi S., Suzuki K., J. Phys. Soc. Japan. 10, 523 (1955); "Magnitnaya struktura ferromagnetikov" str. 204. Pod red. S.V. Vorsovsogo. IL, 1959). This angle will be smaller than  $106^\circ$  if strong stresses are present in the crystal. Measurements of specimens with varying stresses showed values between  $80^\circ$  and  $110^\circ$ , which agree with the theoretical values. For studies without stresses the specimens were polished electrolytically; after that they were annealed in vacuo at  $1000^\circ\text{C}$  for 3 hr and then cooled slowly. The powder patterns which represent the magnetic structure of an annealed specimen, are parallel straight lines. They cover the whole surface and are characteristic of the (110) plane of ferrosilicon. It can be assumed that the line relief is caused by cold rolling of the material, and that the character of the linear magnetic domains of annealed specimens is closely connected with the character of the microstructure. Investigations have shown that strong internal stresses

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Electron-microscopic observations ...

caused by thermal treatment will change the magnetic structure of the specimens. In the present paper, it has been found that there is a certain relation between the microgeometry at the surface of ferrosilicon specimens and the character of their magnetic structure. The stresses caused by mechanical or thermal treatment seem to cause a change of the microgeometry at the surface of the specimen. This can be explained by the anisotropy of the striction properties. The totality of all changes, appearing in the specimen due to anisotropy of the mechanical and magnetic properties will bring about the magnetic structure characterizing the state of the material. Ya.S. Shur, V.R. Abel's, L.V. Kirenskiy, V.V. Veter are mentioned. There are 8 figures and 15 references: 9 Soviet-bloc and 6 non-Soviet-bloc.

ASSOCIATION: Fizicheskiy fakul'tet Moskovskogo gos.universiteta im. M.V. Lomonosova (Division of Physics of Moscow State University imeni M.V. Lomonosov)

Card 4/4

USSR/Nuclear Physics - Photofission, Lagging neutrons

FD-2961

Card 1/1      Pub. 146 - 2/28

Author        : Lazareva, L. Ye.; Ratner, B. S.; Shtranikh, I. V.

Title         : ~~XXXXXXXXXX~~  
               : Delaying neutrons accompanying the photofission of uranium and thorium

Periodical    : Zhur. eksp. i teor. fiz., 29, September 1955, 274-279

Abstract      : The authors obtain curves of decay and yield of delaying neutron radiation that accompanies the photofission of uranium and thorium. Relative to all the neutrons emitted during photofission of uranium and thorium the lagging neutrons amount to  $0.41 \pm 0.02\%$  and  $0.18 \pm 0.01\%$  respectively. Three references.

Institution   : Physical Institute im. P. N. Lebedev, Academy of Sciences USSR

Submitted     : May 31, 1955

USSR/Nuclear Physics - Photofission

FD-2962

Card 1/1            Pub. 146 - 3/28

Author            : Valuyev, B. N.; Gavrilov, B. I.; Zatsepina, G. N.; Lazareva, L. Ye.

Title             : Average number of neutrons in one act of fission during the photo-decay of uranium and thorium

Periodical        : Zhur. eksp. i teor. fiz., 29, September 1955, 280-285

Abstract          : The authors measured the average number of neutrons,  $\nu$ , that are found in one act of fission during the photo-decay of uranium and thorium for mean energy of excitation of the nuclei around 12 Mev. For uranium the obtained value of  $\nu$  is equal to  $6.2 \pm 0.5$ ; for thorium, it is  $14.2 \pm 1.2$ . The measured quantities permitted the authors to evaluate the relative probability of fission during photo-decay of uranium and thorium nuclei. Seven references, all Western.

Institution       : Physical Institute im. P. N. Lebedev, Academy of Sciences USSR

Submitted         : May 31, 1955

LAZAREVA, L. YE.

Category : USSR/Nuclear Physics - Instruments and Installations.  
Methods of Measurement and Investigation

C-2

Ab's Jour : Ref Zhur - Fizika, No 1, 1957, No 280

Author : Lazareva, L.Ye., Feynberg, Ye.L., Shapiro, F.L.

Inst : Physics Inst., USSR Acad. of Sciences

Title : Neutron Spectrometry, Based on the Measurement of the Neutron  
Slowing-Down Time

Orig Pub : Zh. eksperim. i teor. fiziki, 1955, 29, No 3, 381-383

Abstract : Description of a method of neutron spectroscopy, based on monochromatization of neutron energy with time when the neutrons are slowed down in a heavy medium. This change of the neutron spectrum  $n(v,t)$  with time follows from the "age" theory. The natural dispersion of the distribution of the slowing-down neutrons is

$$D = \frac{(\delta v)^2}{v^2} = \frac{3}{2M}$$

where M is the mass of the moderator nucleus. Using as a moderator a

Card : 1/2

Category : USSR/Nuclear Physics - Instruments and Installations. Methods of  
Measurement and Investigation

C-2

Abs Jour : Ref Zhur - Fizika, No 1, 1957, No 280

block of lead weighing several tens of tons one obtains a gain in the neutron stream on the order of 3--4 orders of magnitude compared with the time of flight method. The high "luminosity" of the slowing-down method makes it possible to perform experiments on the spectrometry of neutrons in the energy region of 10 -- 10,000 ev in the presence of a simple neutron source, namely the C T reaction in an ion accelerating tube using several hundred kilovolts. An advantage of this method of spectrometry, based on the slowing-down time, is also the possibility of direct measurement of the absorption cross section, an important factor in those cases, when the absorption is small compared with the scattering. A shortcoming of the limited resolving power (approximately 30% relative to the energy), which is determined by the dispersion (see also Referat Zhurnal Fizika, 1956, 27925).

Card : 2/2

LAZAREVA, L. Ye.

"Survey of Experimental Data on Photofission", a report presented at the  
Conference on the Physics of Nuclear Fission, 19-21 January 1956, Atom Energ., 1956.

LAZAREVA, L. E., POSPELOV, A. N. and ZATZEPINA, G. N.

"Energy Spectrum and Angular Distribution of Photo Neutrons from Bi." a paper presented at the International Conference on Nuclear Reactions, Amsterdam, 2-7 July 1956.

D551274

LAZAREVA, L. E., YAKOVLEV, V. A., BANNIK, B. P. and KULIKOVA, N. M.

"The Angular Distribution of Fission Fragments in the Photo Fission of Uranium"  
a paper presented at the International Conference on Nuclear Reactions, Amsterdam,  
2-7 July 1956.

D551274



LAZAREVA, L. E., NIKOLAYEV, F. A. and BOGDANEVICH, O. V.

"Inelastic Nuclear Scattering of Photons by IN-115" a paper presented at the International Conference on Nuclear Reactions, Amsterdam, 2-7 July 1956.

D551274

LAZAREVA, L. E. and GAVRILOV, B. I.

"Photo Neutron Yields from Medium and Heavy Elements" a paper presented at the International Conference on Nuclear Reactions, Amsterdam, 2-7 July 1956.

D551274

Lazareva, L. E.

Average number of neutrons per fission in the photo-  
disintegration of uranium and thorium. B. N. Valuev,  
B. I. Gavrilov, G. N. Zatsepina, and L. E. Lazareva.  
*Soviet Phys., JETP* 2, 108-10 (1956) (Engl. translation).  
See *C.A.* 50, 2313a. B. M. R.

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Lazareva, L.E.

Delayed neutrons accompanying the photofission of  
uranium and thorium. L. E. Lazareva, B. S. Ratner, and  
I. V. Shtrankh. *Soviet Phys. JETP* **2**, 301-6 (1956) (Engl.  
translation).—See *C.A.* 50, 2313b. B. M. R.

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Neutron spectrometry based on the measurement of the  
time of slowing down of neutrons. L. E. Lazareva, E. L.  
Felsberg, and F. L. Shapiro. *Soviet Phys., JETP* 2,  
351-3(1956)(Engl. translation).—See C.A. 50, 23086.  
B. M. R.

3

*Lazareva, L. E.*

Category : USSR/Nuclear Physics - Nuclear Reactions

C-5

Abs Jour : Ref Zhur - Fizika, No 1, 1957, No 550

Author : Gavrilov, B.I. and Lazareva, L.E.

Inst : Phys. Inst., USSR Acad. of Sciences

Title : Photoneutron Yields from Medium-Heavy and Heavy Nuclei

Orig Pub : Zh. eksperim. i teor. fiziki, 1956, 30, No 5, 855-861

Abstract : The photo neutron yields were measured at various maximum energies of bremsstrahlung -- from the threshold of the  $(\gamma, n)$  reaction up to  $E_{max} = 27$  Mev. The "photon difference" method is used to calculate the photoneutron cross section as functions of the photon energies from the curves for the yield of photoneutrons, obtained for ten elements (Cu, Zn, Cd, I, Ta, Au, Tl, Bi, Th, U).

Card : 1/1

AUTHOR: ZACEPINA, G.N., LAZAREVA, L.E., POSPELOV, A.N. PA - 2031  
 TITLE: The Angle- and Energy Distribution of the Photoneutrons  
 emerging from Bi. (Russian)  
 PERIODICAL: Zhurnal Eksperimental'noi i Teoret.Fiziki, 1957, Vol 32, Nr 1,  
 pp 27-30 (U.S.S.R.)  
 Received: 3 / 1957 Reviewed: 3 / 1957  
 ABSTRACT: The treatise in question studies with the method of thick  
 layer emulsions the distribution of the energy of the photo-  
 neutrons flying out of bismuth at different angles in relation  
 to the direction of the X-ray bundle. Measurements were taken on  
 the 30 MeV synchrotron of the Physical Institute of the Academy  
 of Sciences with a maximum energy of the X-rays ( $E_{\max} = 18,9$  MeV).  
 A drawing demonstrates the arrangement of the experiment and of  
 the photo plates during the irradiation. The dose of the X-rays  
 was measured with a thin integral ionization chamber. The mean  
 value of the background was 10 to 16° at the different angles.  
 On the occasion of microscopic investigation only those recoil  
 protons were registered which were scattered against the  
 moving direction of the neutrons into small angles. The necess-  
 ary corrections are shortly mentioned. The number of the pro-  
 tons recorded on the plates which were arranged at angles of  
 30, 90, 150 and 270° amounted to 2605 after deduction of the

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PA - 2031

The Angle- and Energy Distribution of the Photo-neutrons emerging from Bi. (Russian)

background. A diagram illustrates the spectra of energy  $I(\xi)$  of the photo neutrons obtained at the angles mentioned. The spectra of the neutrons obtained at  $30^\circ$  and  $150^\circ$  are equal within the limits of errors. For  $\gamma$  radiation SCHIFF'S spectrum was used. The modifications of the spectrum of the X-rays while passing the bismuth test and the non-elastic scattering of the neutrons in the test have not been considered. Consideration of these corrections must increase the relative number of the neutrons with the highest energy. The two spectra calculated according to the statistical theory do not agree with the distributions of energy which were obtained for the photo neutrons emerging from bismuth. The experimental spectra of the neutrons agree with the calculated spectra only within a range of energy of from 1,5 to about 4 MeV. Beyond 4 MeV there is a considerable number of neutrons the yield of which must practically be equal to zero after the model of evaporation. At the angles of  $90^\circ$  and  $270^\circ$  the yield of neutrons with more than 4 MeV is considerably larger than at angles of  $30^\circ$  and  $150^\circ$ . The relative yields of neutrons of different energies are laid down in an index. The angle anisotropy increases considerably

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The Angle- and Energy Distribution of the Photo-neutrons emerging from Bi. (Russian)

with the growing energy of the neutron. The dates obtained here must apparently be considered as the result of two different reciprocal actions of the  $\gamma$ -quanta with the nuclei: namely the absorption of the  $\gamma$ -quanta with production of a compound nucleus and successive evaporation and of the direct photoeffect.

ASSOCIATION: Physical Institute "P.N.LEBEDEV" of the Academy of Sciences of the USSR

PRESENTED BY:

SUBMITTED:

AVAILABLE: Library of Congress

Card 3/3

LAZAREVA, L.E.

SUBJECT USSR / PHYSICS CARD 1 / 2 PA - 1648  
 AUTHOR BOGDANKEVIC, O.V., LAZAREVA, L.E., NIKOLAEV, P.A.  
 TITLE The Non-Elastic Scattering of Photons by the Nuclei of Indium 115  
 PERIODICAL Zhurn.eksp.i teor.fis, 31, fasc.3, 405-412 (1956)  
 ISSUED: 12 / 1956

The yield of the reaction  $\text{In}^{115}(\gamma, \gamma') \text{In}^{115}$  was measured in a 30 MeV synchrotron at the maximum energy  $E_{\text{max}}$  of X-rays of from 5-27 MeV. The number of isomeric states of  $\text{In}^{115\text{m}}$  produced after irradiation was measured by means of a scintillation counter which measures the  $\gamma$ -radiation emitted on the occasion of transition from a metastable level to the ground level ( $h\nu = 334 \text{ keV}$ ,  $T = 4.5$  hours). If the conversion coefficient is not very large, the method of registering metastable states chosen in this case is probably more effective than measuring reduced activity by means of the soft conversion electrons. The obtained cross sections of the photoexcitation of the metastable state of

$\text{In}^{115\text{m}}$  indicate the lowest limit of the cross section of the reaction  $\text{In}^{115}(\gamma, \gamma') \text{In}^{115}$ . When dealing with the decay curves of  $\gamma$ -activity occurring in the indium sample, also the curve of the yield of reaction  $\text{In}^{115}(\gamma, 2n) \text{In}^{113\text{m}}$  was determined. For the purpose of comparing the radiation- and neutron yields, the yields of neutrons on the occasion of the photo spallation of indium were measured simultaneously at various X-ray energies.

Зурн. експ. і теор. фіз., 31, fasc. 3, 405-412 (1956) CARD 2 / 2 PA - 1648

The curve of the yield of the reaction  $\text{In}^{115}(\gamma, \gamma') \text{In}^{115m}$ : The indium sample (95,8%  $\text{In}^{115}$ , 4,2%  $\text{In}^{113}$ ) which had a thickness of 2,55 g/cm<sup>2</sup>, was irradiated from a distance of 60 cm from the target of the synchrotron. The flux of  $\gamma$ -quanta impinging upon the sample was measured by means of an ionization chamber with thick walls. On the occasion of the decay of  $\text{In}^{115m}$ , 94,5% of the nuclei pass over into the ground state  $\text{In}^{115}$ , and 5,5% are subjected to a  $\beta$ -decay ( $E_{\text{lim}} = 0,84$  MeV). The average value of the conversion coefficient is  $\alpha = 0,98$ . For purposes of control the absolute yield of the reaction  $\text{In}^{115}(\gamma, \gamma') \text{In}^{115m}$  was measured at the maximum energy  $E_{\text{max}} = 15,75$  MeV also with the help of the electrons of the interior conversion. - The curve of the yield of photo neutrons: When measuring this curve the indium sample was fitted in the center of a paraffin block. The absolute yield of neutrons was determined from the ratio (number of neutrons registered on the occasion of the irradiation of the sample / number of neutrons of a gauged radiation source) ( $\text{Ra}_{\alpha} + \text{Be}$ ). The curve of the yield found here refers practically to  $\text{In}^{115}$ . In the same diagram the yield curve for the reaction  $\text{In}^{115}(\gamma, 2n) \text{In}^{113m}$  is shown. - In conclusion the cross sections of the investigated reactions are discussed in detail.

INSTITUTION: Physical Institute "P.N.LEBEDEV" of the Academy of Science in the USSR.

LAZAREVA, L. YE.  
IGONIN, V.V., LAZAREVA, L.YE., LEPESTEIN, A.I., ZATSEPINA, G.I.

"Angular and Energy Distribution of Photoneutrons,"

Lebedev Physics Inst. Acad. Sci. USSR and Saratov State University

paper submitted at the A-U Conf. on Nuclear Reactions in Medium and Low Energy  
Physics, Moscow, 19-27 Nov 57.

LAZAREVA, L. Ye.  
LAZAREVA, L.Ye.; NIKITINA, N.V.

Photofission. Atom.energ.supplement no.1:189-214 '57. (MIRA 10:10)  
(Nuclear fission)

LAZEREVA L.E. and NIKITINA, N.V.

"Photofission": (U), Atomnaya Energiya, Vol 2, No I, Jan 57, p I00.

SUM. I322

LAZAREVA, L. E.

4130

YIELDS OF PHOTONEUTRONS FROM INTERMEDIATE AND HEAVY NUCLEI. B. I. Gavrilov and L. E. Lazareva (Academy of Sciences, USSR). Soviet Phys. JETP 3, 671-7 (1957) Jan.

The yields of photoneutrons were measured for various maximum  $\gamma$ -bremsstrahlung energies lying between the threshold of the  $(\gamma, n)$  reactions up to  $E_{\max} = 27$  Mev. The photoneutron cross section was determined by the "photon difference method" as a function of the photon energy from the yield curves for ten elements (copper, zinc, cadmium, iodine, tantalum, gold, thallium, bismuth, thorium and uranium). (auth)

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INELASTIC SCATTERING OF PHOTONS BY INDIUM-115

SOCI. OF Q. V. DOLGOVA, L. I. KOSLOVA, and I. A.

Nikol'skaya, Academy of Sciences, USSR, Novosibirsk, 630090

4, 370-371, 1987, 4p.

The yields of the reactions in the inelastic scattering of photons by indium-115

in the energy range 0.1-1.0 MeV were measured by the method of photoactivation

of the nuclei of the target material. The results of the measurements are presented

in the form of a graph and a table. The photoactivation cross sections at

max. energies of 0.1 and 1.0 MeV were calculated by the method of least squares.



Lazareva, L. E.

Distr: 4E3d

1929

ANGLE-ENERGY DISTRIBUTION OF PHOTONEUTRONS

FROM Bi. G. N. Zaitseva, L. E. Lazareva, and A. N. Pospelov (Academy of Sciences, USSR). Soviet Phys.

JETP 6, 21-3(1957) Aug.

The angle-energy distribution of photoneutrons emitted from bismuth bombarded by x rays with a maximum energy  $E_{max} = 18.9$  Mev has been investigated using nuclear emulsions. The energy distribution obtained includes a large number of energetic neutrons which cannot be explained in terms of the statistical theory. (auth)

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LAZAREVA, L. Ye.

AUTHOR  
TITLE

BANNIK, B.P., KULIKOVA, K.K., LAZAREVA, L.Ye., YAKOVLEV, V.A. 56-7-8/66  
Angular Distribution of Photofission Fragments from Uranium.  
(Uglovoye raspredeleniye oskolkov pri fotodelenii urana - Russian)  
Zhurnal Eksperim. i Teoret. Fiziki, 1957, Vol 33, Nr 7, pp 53-55 (U.S.S.R.)

PERIODICAL  
ABSTRACT

With the help of Ilford D-1 plates saturated with uranium the angular distribution of the fission fragments are determined on the occasion of the fissioning of uranium by a  $\gamma$  bombardment with an energy of 9.4, 12, and 26.5 MeV. The 30 MeV synchrotron of the FIAN served as a  $\gamma$  source.

Anisotropy increases very considerably with decreasing  $\gamma$ -energy. For the 3 coefficients, a, b, c, of the function of angular distribution the following values were determined:

$E_{\gamma}^{max}$	b/a	ratio between the anisotropic and isotropic fission yields
9.4	$0.55 \pm 0.09$	$0.55 \pm 0.09$
12	$0.20 \pm 0.07$	$0.13 \pm 0.05$
26.4	$0.07 \pm 0.06$	$0.05 \pm 0.04$

1)

1)  $(\frac{2}{3} \cdot \frac{b}{a} + \frac{2}{15} \cdot \frac{c}{a})$  (2 tables, 1 ill., 3 Slavic references).

ASSOCIATION

Physical Institute "P.N. Lebedev" of the Academy of Sciences of the USSR  
(Fizicheskii institut im. P.N. Lebedeva Akademii nauk SSSR)

SUBMITTED  
AVAILABLE  
Card 1/1

7.2.1957  
Library of Congress.

DENISOV, P.P.,red.; LAZAREVA, L.Ye.,red.; LEYKIN, Ye.M.,red.; ROZHANSKIY,  
I.D.,red.; FRANK, I.M.,red.; SHAPIRO, I.S.,red.; SHAPIRO, F.L.,red.;  
POLENOVA, T.P.,tekhn. red.

[Low and intermediate energy nuclear reactions; transactions of  
the conference] IAdernye reaktsii pri malykh i srednikh energiakh;  
trudy konferentsii. Moskva, Izd-vo Akad. nauk SSSR, 1958. 614 p.  
(MIRA 11:12)

1. Vsesoyuznaya konferentsiya po yadernym reaktsiyam pri malykh  
i srednikh energiakh. Moscow, 1957.  
(Nuclear reactions)



24.6000, 16.8100, 16.8300

77002  
SOV/56-37-6-42/55

AUTHORS: Burgov, N. A., Danilyan, G. V., Dolbilkin, B. S.,  
Lazareva, L. E., Nikolaev, F. A.

TITLE: Letter to the Editor. Fine Structure of a Gigantic  
Resonance

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1959,  
Vol 37, Nr 6, pp 1811-1814 (USSR)

ABSTRACT: In their work, R. Basile and C. Schuhl (cf., C. R. Paris,  
240, 2399, 1955) have shown that the yield curves of  
photonuclear reactions, in the case of light nucleus,  
exhibit a break in the region of the resonance. The  
position and the magnitude of the break depend on the  
substance. The data on the width  $\Gamma$  of these breaks  
are contradictory. Therefore, the existence of this  
resonance was investigated by the direct method. This  
method consisted of the investigation of the fine struc-  
ture of gigantic resonance by means of total absorption.  
The X-ray beam with maximum energy  $E_{\max} = 28.8$  mev was

Card 1/3

Letter to the Editor. Fine Structure  
of a Gigantic Resonance

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SOV/56-37-6-42/55

collimated with a Pb collimator 26 cm thick. Behind the collimator was a graphite block 60 cm ( $96.6 \text{ g/cm}^2$ ) thick. The spectrum of  $\gamma$ -quanta was measured by means of a paired spectrometer. The magnetic field in the spectrograph was stabilized by the "proton resonance" method with a precision better than  $\pm 0.01\%$  (at  $h\nu = 20 \text{ mev}$ , less than  $\pm 2 \text{ kev}$ ). The resolving power of the setup at  $9716 \text{ mev}$  ( $\gamma$ -line from the capture of thermal neutrons by  $\text{Cr}^{53}$  nucleus) was  $65 \text{ kev}$ . The experimental width of the peak observed for carbon nucleus was  $\sim 150 \text{ kev}$ . The integral cross section of the peak was  $9 \text{ mev} \times \text{mbn}$ . These results show that the method is effective in studying the fine structure of gigantic resonances. There is a schematic diagram of the setup; 1 graph; and 11 references, 2 French, 9 U.S. The 5 most recent U.S. references are: A. S. Penfold, B. M. Spicer, Phys. Rev. 100, 1377 (1955); C. Tzara, J. Phys. Rad., 17, 1001 (1956); L. Katz, National Bureau of Standards Photonuclear Conference,

Card 2/3

LAZAREVA, L.YE.

"Survey of the Experimental Works on Photonuclear Reactions"

report submitted for the 2nd USSR Conference on Nuclear Reactions at Low and Intermediate Energies, Moscow, 21-28 July 1960.

S/056/60/039/005/008/05:  
B029/B077

AUTHORS: Bogdankevich, O. V., Lazareva, L. Ye., Moiseyev, A. M

TITLE: Inelastic Scattering of Photons by  $Rh^{103}$  Nuclei

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1960,  
Vol. 39, No. 5(11), pp. 1224-1228

TEXT: The authors measured the yield of the reaction  $Rh^{103}(\gamma, \gamma')Rh^{103m}$  on the synchrotron of FIAN (Physics Institute of the Academy of Sciences USSR) at different maximum bremsstrahlung energy, from 5.9 to 25.5 Mev in intervals of about 1 Mev. The number of isomeric nuclei of  $Rh^{103m}$  ( $T = 56 \pm 1$  min,  $E_\gamma = 40 \pm 0.5$  kev) was determined from decay curves of the induced activity. These measurements were made with specimens of metallic rhodium (purity of 99.9%) 20 and 50  $\mu$  thick (24.8 and 62 mg/cm<sup>2</sup>). The decay of  $Rh^{103m}$  nuclei is characterized by the following quantities: transition energy, 40 kev; conversion coefficient  $\alpha_K$  from the K-shell, 40; ratio of the conversion coefficients on the K-shell and L-shell,  $0.09 \pm 0.01$ , and on the L-shell and M-shell,  $7 \pm 1$ . The yield of the  $Rh^{103}(\gamma, \gamma')Rh^{103m}$  reaction is  $0.09 \pm 0.01$ . ✓

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Inelastic Scattering of Photons by Rh<sup>103</sup>  
Nuclei

S/056/60/039/005/008/051  
B029/B077

reaction was measured with a scintillation counter. X-ray bombardment of rhodium with a maximum energy of up to 25.5 Mev produces radioisotopes in different reactions. The most important reactions with a fraction of about 90% of all decaying rhodium nuclei are  $(\gamma, n)$  and  $(\gamma, 2n)$ . It was possible to excite the metastable states of rhodium Rh<sup>103m</sup> not only by the  $(\gamma, \gamma')$  reaction but also by inelastic scattering of photon neutrons when irradiating the rhodium specimens in the synchrocyclotron. The  $\sigma(E)$  curve has two maxima. The position of the first maximum falls within the experimental accuracy and agrees with the threshold of the  $(\gamma, n)$  reaction. The second maximum is at about 20 Mev; this is 3 to 4 Mev higher than the energy corresponding to the maximum cross section of nuclear absorption of photons (16 Mev). In the range of the second maximum, the cross section cannot be determined as accurately as in the range of the first one. The

The calculated cross section of the Rh<sup>103</sup> $(\gamma, \gamma')$ Rh<sup>103m</sup> reaction gives the lower limit of inelastic nuclear scattering by rhodium. In order to find the total cross section for this reaction it is necessary to know the relative production probability of the isomeric state when the protons are scattered inelastically; if the cross section for the  $(\gamma, \gamma')$  reaction

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Inelastic Scattering of Photons by Rh<sup>103</sup>  
Nuclei

S/056/60/039/005/008/051  
B029/B077

is known, then it is possible to estimate the radiation width  $\Gamma_\gamma$  for different excitation energies. Starting from the threshold of the  $(\gamma, n)$  reaction, the neutron width  $\Gamma_n$  increases rapidly, and the cross section for the  $(\gamma, \gamma')$  reaction decreases accordingly. The ratio of the cross sections  $\sigma(\gamma, \gamma')/\sigma_n$  remains almost constant ( $\sim 0.01$ ) up to 16 Mev. At higher energies, the relative probability of inelastic scattering increases, and amounts to about 10% at 20 Mev. At energies of 20-22 Mev, the radiation of rhodium is 25-30% of the neutron width. I. V. Shtranikh is mentioned. There are 2 figures, 2 tables, and 16 references: 3 Soviet, 11 US, 1 Canadian, and 1 French. ✓

ASSOCIATION: Fizicheskiy institut im. P. N. Lebedeva Akademii nauk SSSR  
(Institute of Physics imeni P. N. Lebedev, Academy of  
Sciences USSR)

SUBMITTED: June 23, 1960

Card 3/3

S/903/62/000/000/027/044  
B102/B234

AUTHOR: Lazareva, L. Ye.  
TITLE: Photonuclear reactions in the region of giant resonances  
SOURCE: Yadernyye reaktsii pri malykh i srednikh energiakh; trudy Vtoroy Vsesoyuznoy konferentsii, iyul' 1960 g. Ed. by A. S. Davydov and others. Moscow, Izd-vo AN SSSR, 1962, 392-407

TEXT: Here the most important papers of the last few years and reports on new investigations (up to 1960) dealing with determinations of giant resonance shape and fine structure are reviewed. The following methods are discussed: (1) Detailed investigation of the cross sections in narrow energy intervals of monochromatic  $\gamma$ -rays; investigation of fine structure via carbon activation  $C^{12}(\gamma, n)$  and via studying  $\gamma$ -radiation attenuation in graphite absorber. (2) Investigation of giant resonance via studying the inverse reaction  $(p, \gamma)$  with e.g.  $B^{11}(p, \gamma)C^{12}$ . (3) X-ray absorption with  $\gamma$ -quantum detector of high resolution. Report on investigations published in ZhETF, 37, 1811, 1959; Phys. Rev. 114, 1621, 1959; Nucl. Phys., 14, 131, 1959; Phys. Rev. 118, 1256, 1960. Also the success gained during recent

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Photonuclear reactions in the region...

S/903/62/000/000/027/044  
B102/B234

years in investigating direct photoeffect and photo-disintegration, especially ( $\gamma, p$ ) reactions with Sn, Sb and Cd isotopes (ZhETF, 39, 1578, 1960 Nuovo Cim., 6, 585, 1957), is reported and nuclear  $\gamma$ -quantum scattering experiments are discussed. The period of review ends with 1960 since the review was lectured at an All-Union Conference in 1960. There are 11 figures, 2 tables, and 37 references.

Card 2/2

S/903/62/000/000/033/044  
B102/B234

AUTHORS: Zatssepina, G. N., Igonin, V. V., Lazareva, L. Ye.,  
Lepestkin, A. I.

TITLE: Direct photoeffect on heavy nuclei with low excitation energies

SOURCE: Yadernyye reaktsii pri malykh i srednikh energiakh; trudy  
Vtoroy Vsesoyuznoy konferentsii, iyul' 1960 g. Ed. by  
A. S. Davydov and others. Moscow, Izd-vo AN SSSR, 1962, 479-485

TEXT: Disc-shaped targets of Bi ( $3.91 \text{ g/cm}^2$ ) and Au ( $3.77 \text{ g/cm}^2$ ) were exposed to bremsstrahlung of  $E_{\gamma \text{ max}} = 14 \text{ Mev}$  of the FIAN synchrotron and the  $(\gamma, n)$  and  $(\gamma, 2n)$  reactions (thresholds 7.4 and 14.2 Mev for Bi and 8.0 and 14.9 Mev for Au) taking place were investigated as to the neutron energy spectra and the levels excited in the target nuclei were calculated. The recoil protons were recorded with 400- $\mu$  НИКФИ-Я2 (NIKFI-Ya2) emulsion plates arranged at angles of 30, 90, 150 and  $270^\circ$  to the  $\gamma$ -ray direction, at a distance of 16 cm from the target center. In microscopic scanning only the recoil protons scattered through small angles with respect to the neutrons ( $\pm 15^\circ$  in the emulsion plane and  $\pm 20^\circ$  inside the emulsion) for neutrons with

Card 1/2

Direct photoeffect on heavy nuclei...

S/903/62/000/000/033/044  
B102/B234

$E_n > 1$  Mev. For measuring the background the specimens were replaced by carbon discs. The neutron energy spectra were determined for  $N_{900} + N_{2700}$  and  $N_{300} + N_{1500}$  and were found to be of equal shape and similar in position. Numerical calculations were made on the basis of the evaporation model; both for Bi and Au the theoretical curves show qualitative agreement but they are somewhat steeper and their tail is shorter by 2-3 Mev. The characteristics of the neutron levels excited in Bi and Au are given as well as indicating the possible transitions and their relative intensities. Part of the data is taken from Ross et al. (Phys. Rev., 102, 1613, 1956). There are 5 figures and 3 tables.

ASSOCIATION: Fizicheskiy institut im. P. N. Lebedeva AN SSSR (Physics  
Institute imeni P. N. Lebedev AS USSR)

Card 2/2

FRANK, I.M., otv. red.; DAVYDOV, A.S., red.; LAZAREVA, L.Ye., red.  
NEMIROVSKIY, P.E., red.; CHUYEV, V.I., red.; POLYAKOVA, T.V.,  
tekhn. red.

[Transactions of the Second All-Union Conference on Nuclear  
Reactions at Low and Medium Energies] Trudy Vtoroy Vsesoyuznoy  
konferentsii po yadernym reaktsiyam pri malykh i srednikh ener-  
gliakh, Moscow. 1960. Moskva, Izd-vo Akad. nauk SSSR, 1962.  
658 p. (MIRA 16:2)

1. Vsesoyuznaya konferentsiya po yadernym reaktsiyam pri ma-  
lykh i srednikh energiyakh, 2d, Moscow, 1960.  
(Nuclear physics—Congresses)

S/056/62/043/001/010/056  
B125/B102

AUTHORS: Burgov, N. A., Danilyan, G. V., Dolbilkin, B. S., Lazareva,  
L. Ye., Nikolayev, F. A.

TITLE: Cross section for  $\gamma$ -quantum absorption by  $O^{16}$  nuclei in the  
giant resonance region

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 43,  
no. 1(7), 1962, 70-78 ✓

TEXT: The total cross section of  $\gamma$ -quantum absorption by  $O^{16}$  nuclei in the energy range 18.9-26.6 Mev was measured by the absorption method with a high-resolution pair magnetic gamma spectrometer used as the detector. The measurements were performed on the 250-Mev synchrotron of the FIAN at a maximum X-ray energy of 200 Mev. The X-ray pencil incident on the absorber (100 g/cm<sup>2</sup> distilled water) was monitored by a thin-walled ionization chamber (integrator). The electron-positron pairs were recorded by two plastic scintillators. The total cross section  $\sigma_{tot}$  for absorption in water was calculated from a measurement of  $N_o/N$  ( $N_o$  = number of

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S/056/62/043/001/C10/056  
B125/B102

Cross section for  $\gamma$ -quantum ...

coincidences without absorber,  $N$  = number of coincidences measured in the energy range 18.9-26.6 Mev with absorber) and was found to be  $(M/AQL) \ln(N_0/N)$ , where  $M$  is the molecular weight,  $A$  is Avogadro's number,  $\rho$  is the density of the absorber, and  $L$  is its length. The cross section for  $\gamma$ -quantum absorption by  $O^{16}$  nuclei, obtained by subtracting the cross sections for pair production and for the Compton effect from the experimental value of  $\sigma_{tot}$ , has four distinct resonance peaks of several hundred kev width at 22.3, 23.05, 24.3, and 25.15 Mev. The sharpness of the resonances in the range 19-21 Mev (especially at 19.4 and 21.2 Mev) is insufficient for a discussion of the structure of the cross section. The integral absorption cross section for the energy range 18.9-26.6 Mev, which was calculated from the cross section for the  $O^{16}(\gamma, N)$  reaction to be  $150^{+30}_{-10}$  Mev·mb, is equal to the sum of the integral cross sections for the reactions  $O^{16}(\gamma, n)$  and  $O^{16}(\gamma, p)$ . For this reason, the cross sections for the other reactions in the giant resonance region are relatively small. There are 4 figures and 1 table.

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Cross section for  $\gamma$ -quantum ...

S/056/62/043/001/010/056  
B125/B102

ASSOCIATION: Fizicheskiy institut im. P. N. Lebedeva Akademii nauk SSSR  
(Physics Institute imeni P. N. Lebedev of the Academy of  
Sciences USSR). Institut teoreticheskoy i eksperimental'noy  
fiziki Akademii nauk SSSR (Institute of Theoretical and  
Experimental Physics of the Academy of Sciences USSR)

SUBMITTED: March 7, 1962

Card 3/3

43379  
S/056/62/043/005/044/058  
B125/B104

24.1.80  
AUTHORS:

Lazareva, L. Ye., Tulupov, B. A.

TITLE:

On a method of investigating the optical anisotropy and the shape of the surface of atomic nuclei

PERIODICAL:

Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 43,  
no. 5(11), 1962, 1910-1913

TEXT: The method proposed is based on finding the direction  $\vec{n}$  from which charged subbarrier particles are emitted from a nucleus after a photo-nuclear reaction.  $\vec{n}$  is the unit vector of the major axis of deformation of the nucleus. In the photodisintegration of deformed nuclei there are two groups of transitions: The one group is associated with the direction  $\vec{n}$  ( $\omega \approx \omega_n$ ). The second group of transitions ( $\omega \approx \omega_1$ ) refers to the two other axes perpendicular to  $\vec{n}$ . In the first group of transitions the amplitude  $F(\vec{p}, \vec{n})$  of departure of a charged subbarrier particle ( $\vec{p}$  is the wave vector of the departing particle) in the coordinate system linked to the residual nucleus has sharp maxima at the angles  $0^\circ$  and  $180^\circ$ . The departing particles in the lab system have the angular distribution  $d\sigma/d\Omega \sim \sin^2 \vartheta + \Delta(1)$

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On a method of investigating...

S/056/62/043/005/044/056  
B125/B104

if  $\Delta E/E \ll 1$ , if the rotational level of a product nucleus is not fixed, if the photons are not polarized, and if the nuclei are not oriented.  $\Delta E$  is the energy of the rotational levels of the residual nuclei,  $E$  is the energy of the departing nuclei,  $\theta$  is the angle between the momenta of the photon and of the departing particle. Estimates of  $\Delta \approx \theta_{1/2}^2$ , where  $\theta_{1/2}$  is the half width of the particle angular distribution in the coordinate system attached to the residual nucleus, resulted in 0.05-0.1. In the frequency range  $\omega \approx \omega_1$ , there is no such general relation as (1). The angular distribution in the region of transitions  $\omega \approx \omega_1$  probably has a relatively flat shape. In this case  $\sigma(0)/\sigma(\pi/2) \approx 1$ . The angular distribution of the subbarrier charged photoparticles in the case of oblate axially deformed nuclei at frequencies of  $\omega \approx \omega_1$  has the general form  $d\sigma/d\Omega \sim 2 + \sin^2 \theta + \dots$ . In this case  $\Delta' \approx 0.05-0.1$ .  $\omega_{||} < \omega_1$  for oblong nuclei,  $\omega_{||} > \omega_1$  for oblate nuclei. The quadrupole moment can therefore be found from the shape of the angular distribution of the subbarrier charged photoparticles. The laws found here apply not only to photonuclear reactions but also, e.g., to the scattering of high-energy protons through small angles. The basic advantage

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On a method of investigating...

S/056/62/043/005/044/058  
B125/B104

of the present method is that it can be applied to nuclei with any spin including  $I = 0$ . Moreover, it is not necessary to confine oneself to alpha-active particles; one can vary the energy of the charged particles, and one has one more distinguished direction. There is 1 figure.

ASSOCIATION: Fizicheskiy institut im. P. N. Lebedeva Akademii nauk SSSR  
(Physics Institute imeni P. N. Lebedev of the Academy of  
Sciences USSR)

SUBMITTED: June 18, 1962

Card 3/3

L 17859-63 EWT(m)/BDS AFFTC/ASD  
 ACCESSION NR: AP3003688

S/0043/63/027/007/0366/0874 58  
 56

AUTHOR: Burgov, N.A.; Danilyan, G.V.; Dolbilkin, B.S.; Lazareva, L. Ye.; Nikolayev, F.A.

TITLE: Levels in  $C^{12}$  and  $O^{16}$  observed in studying the gamma absorption cross section in the region of the giant resonance /Report of the Thirteenth Annual Conference on Nuclear Spectroscopy held in KIEV from 25 January to 2 February 1963/

SOURCE: AN SSSR, Izv.Seriya fizicheskaya, v.27, no.7, 1963, 866-874

TOPIC TAGS: giant resonance, gamma-ray absorption, energy level,  $C^{12}$ ,  $O^{16}$

ABSTRACT: Investigations performed during the last decade indicate that the broad peak in the energy variation of the absorption cross section for light nuclei is actually a group of individual resonances and that what is called the giant resonance is actually the envelope of these individual resonances. Hence investigations of giant resonances can yield information on high-lying levels in light nuclei. One possibility for such studies is the use of continuous bremsstrahlung with separation of a narrow  $\gamma$ -ray interval by means of a detector with high resolution. By way of such a detector the authors designed a magnetic pair spectrometer. It was used for measuring the  $\gamma$ -ray absorption cross sections of  $C^{12}$  and  $O^{16}$  in the 13 to 27 MeV interval. The equipment was used in conjunction with the Physical

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L 17859-63

ACCESSION NR: AP3003688

Institute 250 MeV synchrotron operated at a maximum bremsstrahlung energy of 200 MeV. The experimental arrangement is shown in Fig.1 of the Enclosure. The measurements disclosed a number of levels in  $C^{12}$  and  $O^{16}$  in the energy range from 16 to 27 MeV. There are listed in tables and the deduced energy values are compared with the experimental results of other investigators and the results of theoretical calculations. In many cases the agreement is good. The net results, however, point up the need for more thorough investigations of giant resonances using improved techniques and particularly detectors with higher resolution. Orig. art. has: 4 figures and 4 tables.

ASSOCIATION: Institut teoreticheskoy i eksperimental'noy fiziki Goskomiteta po mirnomu ispol'zovaniyu atomnoy energii SSSR (Institute of Theoretical and Experimental Physics, State Committee on Peaceful Uses of Atomic Energy, SSSR); Fizicheskiy institut AN SSSR im. P. N. Lebedeva (Physics Institute AN SSSR)

SUBMITTED: 00

DATE ACQ: 02Aug63

ENCL: 01

SUB CODE: NS

NO REF SOV: 003

OTER: 015

Car 2/3

L 13621-63 EWT(m)/BDS AFFTC/ASD  
 ACCESSION NR: AP3003099

S/0056/63/044/006/1787/1799 58  
 53

AUTHOR: Zatsepina, G. N.; Igonin, V. V.; Lazareva, L. Ye.; Lepestkin, A. I.

TITLE: Angular and energy distributions of photoneutrons from bismuth, gold, and tantalum

SOURCE: Zhurnal eksper. i teor. fiziki, v. 44, no. 6, 1963, 1787-1799

TOPIC TAGS: photoneutron, angular distribution, energy distribution, bismuth, gold, tantalum, giant resonance region

ABSTRACT: The angular and energy distributions of photoneutrons from bismuth, gold, and tantalum irradiated by X-rays of peak energy 14 and 19 MeV were measured in order to study the interaction between Gamma quanta and heavy nuclei in the region above the giant resonance. The work was done with the synchrotron (30 MeV) of the Physics Institute, Academy of Sciences SSSR. The photoneutron spectra were registered by their recoil protons, using nuclear emulsions, which were scanned under microscopes. Summary spectra were obtained for the neutrons emitted at right angles (90 and 270°) to the x-ray beam, and also for the angles 30 and 150°. Their experimental results were compared with calculation made by the evaporation model and by the independent-particle model. The neutron energy

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L 13621-63

ACCESSION NR: AP3003089

5

regions in which the various calculated and experimental distributions agree and disagree are discussed in light of the possible shells and possible transitions to which they can be due. "The work was done at the Physics Institute, Academy of Sciences SSSR, in collaboration with the staff members of the Saratovskiy gosudarstvennyy universitet im. N. B. Chernishevskiy (Saratov State University.) N. Ya. Avdokushina, L. V. Baranova, and L. P. Bogatkina helped with the scanning of the emulsions, for which the authors express their deep gratitude." Orig. art. has: 2 formulas, 9 figures, and 3 tables.

ASSOCIATION: Fizicheskiy institut im. P. N. Lebedeva Akademii nauk SSSR (Physics Institute, Academy of Sciences SSSR)

SUBMITTED: 02Jan63

DATE ACQ: 23Jul63

ENCL: 00

SUB CODE: 00

NO REF SOV: 003

OTHER: 023

Card 2/2

BOGDANKEVICH, O.V.; DOLBILKIN, B.S.; LAZAREVA, L.Ye.; NIKOLAYEV, F.A.

Inelastic scattering of gamma quanta on  $\text{Ag}^{107}$  nuclei. Zhur.  
eksp. i teor. fiz. 45 no.4:882-891 0 '63. (MIRA 16:11)

1. Fizicheskiy institut imeni P.N.Lobachevskogo AN SSSR.

ACCESSION NR: AP4009083 S/0056/63/045/006/1693/1703

AUTHORS: Burgov, N. A.; Danilyan, G. V.; Dolbilkin, B. S.; Lazareva, L. Ye.; Nikolayev, F. A.

TITLE: Cross section for absorption of Gamma quanta by carbon nuclei in the giant resonance region

SOURCE: Zhurnal eksper. i teoret. fiziki, v. 45, no. 6, 1963, 1693-1703

TOPIC TAGS: carbon nucleus, gamma absorption cross section, giant resonance, nuclear absorption, nuclear absorption cross section, integral cross section

ABSTRACT: In order to gain additional information about the high-lying excited levels of carbon, the cross section for nuclear absorption of  $\gamma$  rays by carbon was measured by the absorption method in the 13--27 MeV region, using the 250-MeV synchrotron of the

Card 1/3

ACCESSION NR: AP4009083

Fizicheskiy institut AN SSSR (Physics Inst. AN SSSR) and a pair magnetic spectrometer as the  $\gamma$  detector. The cross section curve has five peaks at 16.5, 17.6, 19.1, 23, and 25.6 MeV. The measured  $C^{12}$  nuclear absorption cross section in the giant resonance region is compared with theoretical calculations and with experimental photonucleon spectra and cross sections for the  $C^{12}(\gamma, n)$  and  $C^{12}(\gamma, p)$  reactions in the same energy region. The integral cross section in this region is found to be  $84 \pm 10$  MeV-mb and comprises about one-half the value calculated from the sum rule, indicating that in the case of carbon the giant resonance region below 30 MeV includes approximately half of the integral cross section for dipole transitions. "We wish to thank N. S. Kozhevnikov for much assistance with the measurement and data reduction, and B. A. Tulupov for numerous profitable discussions." Orig. art. has: 2 figures, 6 formulas, and 3 tables.

Card 2/3

ACCESSION NR: AP4009083

ASSOCIATION: Institut teoreticheskoy i eksperimental'noy fiziki  
(Institute of Theoretical and Experimental Physics); Fizicheskiy  
institut im. P. N. Lebedeva, AN SSSR (Physics Institute, AN SSSR)

SUBMITTED: 03Jun63

DATE ACQ: 02Feb64

ENCL: 00

SUB CODE: PH

NO REF SOV: 003

OTHER: 029

Card 3/3

LAZAREVA, L. Ye.

"Concerning High Excited States of Light Nuclei."

report submitted for All-Union Conf on Nuclear Spectroscopy, Tbilisi,  
14-22 Feb 64.

DOLBILKIN, B. S.; ZAPEVALOV, V. A.; KORIN, V. I.; LAZAREVA, L. Ye.; NIKOLAYEV, F. A.

"Gamma absorption cross-section of Mg and Al nuclei in the giant resonance region."

report submitted for Intl Conf on Low & Medium Energies Nuclear Physics,  
Paris, 2-8 Jul 64.

Lebedev Inst, Moscow.

L 2356-66 EWT(m)/EWP(t)/EWP(b) DIAAP/IJP(c) JD

ACCESSION NR: AP5016285

UR/0386/65/001/005/0047/0054

AUTHOR: Dolbilkin, B. S.; Korin, V. I.; Lazareva, L. Ye.; Nikolayev, F. A.

TITLE: Cross section for the absorption of gamma quanta by oxygen nuclei in the energy interval 13.5 -- 22 MeV

SOURCE: Zhurnal eksperimental'noy i tekhnicheskoy fiziki, Pis'ma v redaktsiyu. Prilozheniye, v. 1, no. 5, 1965, 47-54

TOPIC TAGS: oxygen, gamma ray absorption, nuclear cross section

ABSTRACT: The authors present results of more accurate measurements, made by a procedure previously described (ZhETF v. 43, 70, 1962, Izv. AN SSSR ser. fiz. v. 27, 886, 1963), of the cross section for the absorption of gamma quanta by  $O^{16}$  nuclei. The measurements were made with a 260 MeV synchrotron of the Physics Institute of the Academy of Sciences. To increase the efficiency of the method, the gamma rays were detected with a 9-channel paired magnetic spectrometer, described in detail elsewhere (Nucl. Phys. in press). The results are shown in Fig. 1 of the Enclosure. The corresponding energies of the  $O^{16}$  levels are calculated and tabulated. The results obtained by various methods are sufficiently close to one another. There is, however, some discrepancy between the theoretical and experimental values ob-

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L 2356-66

ACCESSION NR: AP5016285

tained for the relative sum of the oscillator strengths for the first three transitions. Possible causes of the discrepancy are briefly discussed. Orig. art. has: 2 figures and 1 table.

ASSOCIATION: Fizicheskiy institut im. P. N. Lebedeva AN SSSR (Physics Institute, AN SSSR)

SUBMITTED: 28Apr65

ENCL: 01

SUB CODE: NP

NO REF SOV: 003

OTHER: 011

Card 2/3

L 2356-66

ACCESSION NR: AP5016285

ENCLOSURE: 01

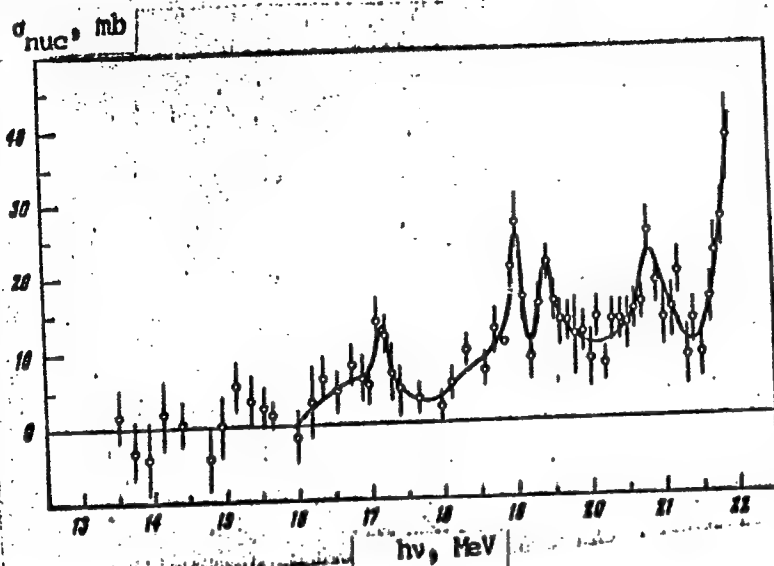


Fig. 1. Cross section for the absorption of gamma quanta by  $O^{16}$  nuclei in the energy interval 13.5 - 22 MeV.

OC  
Card 3/3

L 41313-66 EWT(m)/ENP(t)/ETI IJP(c) JH/JM/JD

ACC NR: Ap6019632

SOURCE CODE: UR/0048/66/030/002/0349/0358

AUTHOR: Dolbilkin, B.S.; Zapevalov, V.A.; Korin, V.I.; Lazareva, L.Ye.; Nikolayev, P.A.

ORG: Physics Institute im. P.N.Lobedev of the Academy of Sciences of the SSSR  
(Fizicheskii institut Akademii nauk SSSR)

TITLE: <sup>19</sup>Gamma ray absorption cross sections of F-19, Mg-24, and Ca-40 in the 10 to 30 MeV energy region /Report, Fifteenth Annual Conference on Nuclear Spectroscopy and Nuclear Structure, held at Minsk, 25 January to 2 February 1965/

SOURCE: AN SSSR. Izvestiya. Seriya fizicheskaya, v. 30, no. 2, 1966, 349-358

TOPIC TAGS: gamma ray absorption, gamma spectrometer, absorption spectrum, fluorine, magnesium, calcium

ABSTRACT: An electron-positron pair type  $\gamma$ -ray spectrometer with an energy resolution of 220 keV at 20 MeV has been employed to measure the absorption cross sections of  $F^{19}$ ,  $Mg^{24}$ , and  $Ca^{40}$  for 10 to 30 MeV  $\gamma$  rays in the bremsstrahlung beam from a 260 MeV synchrotron. As absorbers there were employed a 138.6 g/cm<sup>2</sup> block of commercial teflon (the absorption due to carbon was eliminated with the aid of measurements with a 33.3 g/cm<sup>2</sup> graphite absorber), a 112.4 g/cm<sup>2</sup> block of 99.9% pure metallic magnesium, and a 70.84 g/cm<sup>2</sup> block of 99% pure metallic calcium, kept in an oil bath. The measured absorption cross sections were corrected for non-nuclear absorption due to

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L 42313-66

ACC NR: AP6019632

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pair production and the Compton effect by techniques described in detail elsewhere by N.A.Burgov and the authors (Zh. eksperim. i. teor. fiz., 48 70 (1962); 45, 1693 (1963)). The nuclear absorption cross sections are presented graphically, are compared with the data and calculations of numerous experimenters and theoreticians, and are discussed at length. The  $\gamma$ -ray absorption cross sections of  $F^{19}$ ,  $Mg^{24}$ , and  $Ca^{40}$ , integrated over the investigated energy range, were 335, 365, and 930 mb MeV, respectively. The integrated cross sections of  $F^{19}$  and  $Ca^{40}$  agree, within the experimental error, with the values given by the dipole sum rule, but the measured integrated cross section of  $Mg^{24}$  is only 72% of the sum rule value, although there are theoretical calculations indicating that substantially all the dipole transitions in  $Mg^{24}$  should lie below 30 MeV. Further theoretical work is required. The authors thank N.S.Kozhevnikov for assistance with the measurements, P.A.Cherenkov for the opportunity to use the 260 MeV synchrotron, and B.A.Tulupov for valuable discussions. Orig. art. has: 2 formulas, 5 figures, and 6 tables.

SUB CODE: 20

SUBM DATE: 00

ORIG. REF: 008 OTH REF: 021

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Mechanical properties of sodium in the field of low-temperature  
polymorphic transformations. Fiz. met. i metalloved. 12 no.6:  
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TITLE: Mechanical properties of structural alloys at low temperature

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TOPIC TAGS: alloy, structural alloy, austenitic iron alloy, Kh25N16G7AR alloy, Kh12N20T3R alloy, Kh16G9AN4 alloy, KhN35VTYu alloy, titanium alloy, OT4 alloy, copper alloy, BrKh08 alloy, ZhS6KP alloy, steel, martensitic steel, VNS2 steel, EI659 steel, cryogenic alloy

ABSTRACT: Mechanical properties and fracture tests of Kh25N16G7AR, Kh12N20T3R, Kh17G9AN4, KhN35VTYu; austenitic iron base alloys VNS2 (EP225) and EI659, martensitic steels, ZhS6KP high-strength alloy, OT4 titanium alloy, BGKh08 copper alloy, and other [unidentified] alloys were investigated at temperatures in the 4.2—300K range.

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Specimens (either flat with a cross section of 1.5 x 2 mm or round and 2.2 mm in diameter) were tested in a heat-treated condition [shown in the article]. With a decreasing test temperature the resistance to plastic deformation and the tensile strength of all alloys increased. This was found to be particularly pronounced in the case of VNS2 alloy which at 293, 77, and 20K had a tensile strength of 97.5, 155.0, and 180.0 kg/mm<sup>2</sup> (annealed at 950C, air cooled, and tempered at 620C for 1 hr). All alloys were found to maintain some ductility at temperatures as low as that of liquid hydrogen except for El659 steel and OT4 alloy which failed with respective elongations of 0% (at 20K) and 0.7% (at 77K). The elongation of the VNS2 alloy, on the contrary, was found to increase with a decrease of temperature from 15% at 293K to 20% at 20K. BGKh08 copper-base alloy was also very ductile at low temperatures (at 4.2K an elongation of 18.6%). A simultaneous increase of the ductility and strength of VNS2 alloy might be explained by some changes of phase composition under the effect of low-temperature deformation. All the materials tested at temperatures down to 20K yielded uniformly, some with, some without necking. Only in the case of the VNS2 steel did the strain-stress curve at 20K have a saw-like

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shape. However, at temperatures above 20K the steel yielded uniformly. The fracture mode was ductile with clearly expressed necking even at 20K. Orig. art. has: 1 figure and 1 table.

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